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// G06F 17/50

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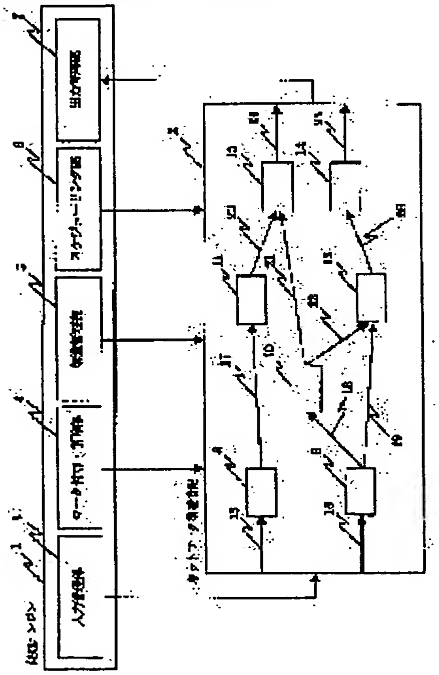
(54) DEVICE AND METHOD FOR NETWORK TYPE INFORMATION PROCESSING

(57)Abstract:
PROBLEM TO BE SOLVED: To make processible information in proper order and in the shortest operation time without having an independent phase wherein sorting is performed by controlling whether or not a node requires recalculation as a result of the addition and deletion of a mark.

SOLUTION: An input management part 3 transmits inputted information to a network structure 2 and when a variation of the input is detected, a mark addition and deletion part 4 gives a mark to a node whose output is not determined. A scheduling part 6 searches for and schedules nodes having only outputs from nodes having unmarked inputs among marked nodes and the input to a node is compared with the last input; when there is a change, the node is evaluated again to calculate a new output and the mark addition and deletion part 4 deletes the mark. The arithmetic result when all the nodes are unmarked is outputted by an output management part 7.



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CLAIMS

[Claim(s)]
[Claim 1]A network type information processor which comprises processing engine and network structure information, comprising:
The input Management Department where said processing engine transmits an input from the outside to said network structure information.

Mark addition and a cutout which adds or deletes a mark which shows that an output becomes indefinite to a node from which an input changed among nodes contained in said network structure information
A scheduling section which performs scheduling of a re-calculation of said node.
When it comprises an output control department which outputs a calculation result of said network structure information and an input from said input Management Department changes, they are said input and a dependency at said mark addition and cutout.

[Claim 2]The network type information processor according to claim 1 which considers the last calculation result as an output without re-calculating when an input to said node to which last input and a calculation result were saved for every aforementioned node to, and a mark was added is in agreement with last time.
[Claim 3]The network type information processor according to claim 1 or 2 which makes one group said two or more [which is contained in said network structure information] nodes, and deals with said group as said node.
[Claim 4]The network type information processor according to claim 1 which performs dynamically an addition and deletion of each aforementioned node at said structure Management Department at the time of execution including further the structure Management Department which adds and deletes a link between said node contained in said network structure information, and said node.
[Claim 5]It is a network type information processing method characterized by comprising the following using processing engine and network structure information, and is said processing engine.
A process of transmitting an input from the outside to said network structure information.
A process of adding or deleting a mark which shows that an output becomes indefinite to a node from which an input changed among nodes contained in said network structure information.
A process of performing scheduling of a re-calculation of said node.
When said input changes including a process of outputting a calculation result of said network structure information, they are said input and a dependency.

[Claim 6]It is the recording medium which recorded a program which a computer which realizes a network type information processing method characterized by comprising the following using processing engine and network structure information is made to execute and in which computer reading is possible, and is said processing engine.
A step which transmits an input from the outside to said network structure information.
A step which adds or deletes a mark which shows that an output becomes indefinite to a node from which an input changed among nodes contained in said network structure information.
A step which performs scheduling of a re-calculation of said node.
When said input changes including a step which outputs a calculation result of said network structure information, they are said input and a dependency.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the network type information processor and the method that the parts which have input and output combine with network structure, and are arranged.
[0002]
[Description of the Prior Art]When a scale is aimed at complicated large processing from the former in building an information processor, The whole processing concerned is divided into two or more unit parts with a small scale in which processing is comparatively easy, and the method of building the information processor concerned by connecting them and considering it as network structure is used well. This method is one of the methods which attract attention also from a viewpoint of measuring reuse of the unit part of processing as a means of problem solving.
[0003]In such a network type information processor, since data flow always exists, it does not operate normally only by connecting an unit part simply. Therefore, data flow is made to suit and it is necessary to process every unit part in a suitable order.
[0004]Conventionally, the method of sorting to control of this processing order paying attention to the dependency between unit parts is used well. For example, after performing a topological sort about an unit part from a network dependency, it is the method of calculating in order after sorting.
[0005]
[Problem(s) to be Solved by the Invention]However, in the method of using sorting which was mentioned above, when the network structure itself, such as addition of an unit part and change of connection relation, changes, it will be necessary to resort the whole again. When especially network structure is huge, the time which this re-sorting work takes is not the time of the level which can be disregarded. Therefore, changing network structure dynamically in practice at the time of instruction execution had included the problem of being difficult.
[0006]An object of this invention is to provide the network type information processor and method of being a suitable order and processing by the minimum calculation time, without having the independent phase of sorting, in order to solve the above-mentioned problem.
[0007]
[Means for Solving the Problem]To achieve the above objects, a network type information processor concerning this invention, The input Management Department where it is a network type information processor which comprises processing engine and network structure information, and processing engine transmits an input from the outside to network structure information, Mark addition and a cutout which adds or deletes a mark which shows that an output becomes indefinite to a node from which an input changed among nodes contained in network structure information, It comprises a scheduling section which performs scheduling of a re-calculation of a node, and an output control department which outputs a calculation result of network structure information, When an input from the input Management Department changes, in a node which added a mark to a node which has an input and a dependency by mark addition and a cutout and to which a mark was added, From a node which is only an output from a node in the state where a mark is not added, an input carries out scheduling and re-calculates, A re-calculation is repeated until a node which deleted a mark from a node to which a mark is added and to which a mark was added stops existing in network structure information, when a re-calculation is completed.
[0008]If it can be controlled by addition and deletion of a mark whether it is a node which is the necessity for a re-calculation and only a node which is the necessity for a re-calculation re-calculates it by them, it will be a suitable order, and this composition enables it to perform processing by the minimum calculation time moreover.

[0009]As for a network type information processor concerning this invention, when an input to a node to which last input and a calculation result were saved for every node to, and a mark was added is in agreement with last time, it is preferred to consider the last calculation result as an output, without re-calculating. It is because it will not change about an output from the node concerned, either, if an input to a node is in agreement with the last input, so a waste of a computer resource can be prevented beforehand and shortening of arithmetic processing time can be attained by extension by avoiding performing data processing again.

[0010]As for a network type information processor concerning this invention, it is preferred to make into one group two or more nodes contained in network structure information, and to deal with a group as a node. It is because the number of links which should be taken into consideration can be decreased and shortening of arithmetic processing time can be attained by recognizing two or more nodes to be one node. It is because it becomes easy to generate a node which has a new function and part-ization of a program can also be promoted with combination of a node.

[0011]As for a network type information processor concerning this invention, it is preferred to perform an addition and deletion of each node dynamically at the structure Management Department at the time of execution, including further the structure Management Department which adds and deletes a link between nodes contained in network structure information. In application which outputs the result of an operation continuously, it is because it is not preferred for an output to stop or to become discontinuous.

[0012]This invention is characterized by software which performs a function of the above network type information processors as a processing step of a computer, and it specifically, A process of transmitting an input from the outside to said network structure information in processing engine, A process of adding or deleting a mark which shows that an output becomes indefinite to a node from which an input changed among nodes contained in network structure information, When an input changes including a process of performing scheduling of a re-calculation of a node, and a process of outputting a calculation result of network structure information, in a node which added a mark to a node which has an input and a dependency and to which a mark was added, From a node which is only an output from a node in the state where a mark is not added, an input carries out scheduling and re-calculates, A mark is deleted from a node to which a mark is added if a re-calculation is completed, It is characterized by being the recording medium which recorded as a program a network type information processing method and such a process of repeating a re-calculation and in which computer reading is possible until a node to which a mark was added stops existing in network structure information.

[0013]By performing by making the program concerned load to up to a computer by this composition. If it can be controlled by addition and deletion of a mark whether it is a node which is the necessity for a re-calculation and only a node which is the necessity for a re-calculation re-calculates it by them, it will be a suitable order, and it becomes possible to realize a network type information processor it becomes possible to perform processing by the minimum calculation time moreover.

[0014]

[Embodiment of the Invention](Embodiment 1) The network type information processor concerning the embodiment of the invention 1 is explained hereafter, referring to drawings. Drawing 1 is a block lineblock diagram of the network type information processor concerning the embodiment of the invention 1. In drawing 1, 1 shows processing engine and 2 shows network structure information.

[0015]The input Management Department 3 which gives the information as which the processing engine 1 was inputted to network structure information, The mark addition and the cutout 4 which adds or deletes a mark to the node contained in the network structure information 2, It comprises the structure Management Department 5 which performs a node, generation, deletion of a link, etc., the scheduling section 6 which carries out scheduling of the order of a node re-calculation correctly, and the output control department 7 which acquires and outputs the output from the network structure information 2.

[0016]The network structure information 2 comprises a node which has arbitrary numbers of input and output, and a link which has the directivity which shows those dependencies. For example, when it depends for the link 17 on the output from the node 8 and the output of the node 8 changes, it means that it will be necessary to re-calculate the node 11 and and that the node 8 must opt for the output ahead of the node 11.

[0017]First, the inputted information is given to the network structure information 2 at the input Management Department 3. Here, when an input is constancy, it becomes constant [the output of the network structure information 2]. For example, in using the device concerning this Embodiment 1 for the action determination of the character currently displayed on the screen, unless external environment changes, the action which a character chooses does not change. Therefore, it is controllable by the input Management Department 3 also about whether the input concerning the network structure information 2 is told. By carrying out like this, an unnecessary operation can be avoided and a waste of a computer resource can be prevented.

[0018]Next, when change of an input is detected, mark addition and the cutout 4 are started. Mark addition and the cutout 4 give a mark about a node with an undecided output of a node, i.e., the node which may need to re-calculate by the input which changed. The mark situation map of network structure information when the input 16 changes is shown in drawing 2. As for mark addition and the cutout 4, although it will give the mark to the node which pursues the node which depends from the changeful input and has a dependency, considering the grant efficiency in this case, it is preferred to give a mark according to depth first search as shown below.

[0019]For example, in drawing 2, since the input 16 is linked to the node 9, a mark is first given to the node 9. Next, since the node 9 has the node 10 and a dependency through the link 18, a mark is also given to the node 10.

[0020]Here, although, as for the node 9, the node 12 has a dependency through the link 19, the node 12 has a dependency through the link 22 also with the node 10 simultaneously.In this invention, since the mark is given searching by giving priority to a node with a link hierarchy's shallow depth in a network, it is judged that the node 12 is a node in which a link hierarchy is deeper than the node 10, and it does not become a candidate for mark grant in this time about the node 12.

[0021]And a mark is given to the node 13 through the link 21 by the mark having been given to the node 10. Since the output 24 of the node 13 is an output of the network structure information 2, it cannot search deeply any more. Then, only one link returns in front and a mark is given to the node 12 through the link 22 from the node 10.

[0022]Hereafter, a mark will be given to the hatching portions in drawing 2 by giving a mark about the node 14 similarly. Although mark grant of the node 12 may be carried out also by passing through the link 19 from the node 9, since it is in the state where the mark was already given at this time, it is not necessary to take a previous mark state into consideration in particular from this.

[0023]Next, at the structure Management Department 5, a new addition, deletion, etc. of a node within the network structure information 2 are performed. When adding a node and building a new link, to an existing node and link, the influence can add dynamically a node which corresponds to the addition of a new decision criterion, and the addition of what is called study conditions by making it not give in any way. That is, it is not necessary to stop the program itself at the time of a node addition, and a new node can be added even if it is under execution.

[0024]In the scheduling section 6, an input searches for and carries out scheduling of the node which is only an output from the node in the state where the mark is not given among the nodes to which the mark is added. For example, in drawing 2, the node of this state is limited to the node 9.

[0025]A re-calculation will be performed from the node by which scheduling was carried out. Here, the case where it is changing with the case where the input to the node by which scheduling was carried out changes, and does not carry out as compared with the last input is processed as follows.

[0026]First, when the input is not changing, by reusing the last calculation result, it becomes possible to reduce the whole operation amount, and leads to prevention of a waste of a computer resource by extension.

[0027]On the other hand, when the input is changing, a new output is calculated by reappraising a node. The mark of the node which re-calculated by mark addition and the cutout 4 is canceled at the same time it re-calculates. In drawing 2, when the re-calculation of the node 9 finishes, the mark of the node 9 will be canceled.

[0028]A re-calculation is repeated until it can check that the mark is canceled about all the nodes. And the result of an operation at the time of a mark being canceled thoroughly is outputted in an output control department.

[0029]The advancing state of the processing about the mark mentioned above from drawing 3 to drawing 5 is illustrated. That is, drawing 3 shows first the state where the node 9 was scheduled and the mark was canceled. Here, if it searches for the node which can be scheduled next, the node 10 and the node 12 can be considered, but whichever it schedules previously, the end product of an operation is not influenced.

[0030]Then, the state where the node 10 was scheduled first is shown in drawing 4. In drawing 4, since the nodes which can be scheduled next are the node 12 and the node 13, they show drawing 5 the state where it scheduled in order, in parallel also about these nodes.

[0031]In drawing 5, since the node which remains at the end is only the node 14, it is scheduling the node 14 finally and the mark will be canceled about all the nodes.

[0032]In this Embodiment 1, the method of comparing with the last result of an operation, for example at the time of the schedule of a node can be used for judgment whether the input to the node changed. However, as long as it is not by the thing limited to the method of starting but by the method of having the same effect, what kind of method may be used. For example, it may be the method of setting a flag to other nodes currently referred to when the result-of-an-operation output of a node changes. For example, in drawing 2, as a result of reappraising the node 9, when an arithmetic output value changes, the method of setting up the flag which shows that the input is changing to the node 10 and the node 12 is also considered.

[0033]When an input does not change, since a node output does not change, either, it becomes unnecessary [a re-calculation], but even if it is a case where an input changes, also when a node output does not change, it can think. For example, whenever it thinks by a simple node as shown in drawing 6, an output value is "TRUE", even if it obtains with the input values to this node and changes from 1 to 100. Therefore, what is necessary is just to judge the necessity for a re-calculation by making only an output value into a decision criterion, since it may not change if the output value may change even if an input value changes.

[0034]Next, it explains, referring to drawings for one example of the network type information processor concerning this Embodiment 1. Drawing 7 is a lineblock diagram of the network type information processor concerning one example of this invention. Drawing 7 applies the network type information processor concerning this Embodiment 1 to the feeling and the action selection device of virtual creatures. in drawing 7 -- 27 -- an image display device -- 28 -- processing engine -- 29 -- network structure information -- 30 -- an input controlling device -- 31 -- mark addition / deletion device -- 32 shows a structure controlling device, 33 shows a scheduler, and 34 shows an output control device, respectively.

[0035]First, the image display device 27 shows the device which actually expresses action with selected virtual creatures by a picture, and a computer display, LCD, etc. are used well. The image display device 27 can be outputted about a luminosity, atmospheric temperature, a wind, etc. which are the information on the world where it calculates also about the result of a display, for example, the position of virtual creatures and virtual creatures exist at the same time it displays the action which virtual creatures chose.

[0036]The processing engine 28 tells the state of the exterior from the image display device 27 to the network structure information 29 by passing the external information node 35. And the internal state is calculated in the network structure information 29. For example, when the output of the external luminosity node 36 changes or the output of the activity node 37 of virtual creatures changes, the feeling and action of virtual creatures are chosen.

[0037]By this example, when the sleepiness node 38 is dark in the exterior and the activity of virtual creatures is low, the action decision model of becoming large is shown, for example. Similarly, the blind-munchies node 39 has also realized the feeling decision model of going up if the state where activity is high is continued. The action selection node 40 judges these information synthetically, gives a priority, and outputs the action which should be performed to the next.

[0038]Drawing 8 adds the feeling-of-happiness node 41 to the network structure information 29 in the network type information processor shown in drawing 7 as a node with the new structure controlling device 32. Here, the input from the sleepiness node 38 and the blind-munchies node 39 and the output to the action selection node 40 are newly set up, and it is not affected at all about the dependency about the existing node. Therefore, it turns out that it has the form where the new decision criterion on the action selection a "feeling of happiness" was added.

[0039]In drawing 9, the destination choice node 44 is added and it links with the action selection node 40. In this case, if the inputted distance becomes nearer than a fixed distance, let the position concerned be a destination. It becomes possible to change the destination according to a situation as an input to this destination choice node 44, for example because the structure controlling device 32 changes to the distance node 42 to food, and the distance node 43 grade to a nest.

[0040]Of course, since only the decision criterion in the destination choice node 44 changes depending on the change of the structure controlling device 32, the dependency about the existing node has not been affected at all. Therefore, even if the change of the structure controlling device 32 is during execution of a program, it can be carried out dynamically, without stopping a program.

[0041]As mentioned above, according to this Embodiment 1, it can carry out without passing through the independent process of a node attaching renewal of network structure information, and sorting it, and it becomes possible to change the dependency between nodes freely. Even if it is a case where change arises in network structure by an addition, deletion, etc. of a node, it becomes possible to perform continuously, without interrupting processing.

[0042](Embodiment 2) The embodiment of the invention 2 is described below, referring to drawings.

[0043]Drawing 10 is an illustration figure of the network structure information 2 in the network type information processor concerning the embodiment of the invention 2. In drawing 10, grouping of a part of network structure information 2 is carried out, and the group 26 is dealt with as one node.

[0044]The node 10, the node 11, and the node 12 are made into the one group 26, and, specifically, an input deals with the group 26 as one node 17 and 18, and whose output are 20 and 23. In this case, when the input 16 changed, for example, in the state where grouping is not carried out, the mark was added to five nodes, the node 9, the node 10, the node 12, the node 13, and the node 14.

[0045]As grouping of this was carried out and it was shown in drawing 11, when the inside was concealed as one node and the input 16 similarly changes, a mark will be added to four nodes, the node 9, the node 26, the node 13, and the node 14, and the number of marks decreases by node structure being simplified.

[0046]When there is no change in the output of the node 9, it will be necessary to carry out no scheduling about the inside of the node 26. Therefore, it becomes possible by carrying out grouping to enjoy the profits that the whole operation amount can be decreased.

[0047]As mentioned above, according to this Embodiment 2, by recognizing two or more nodes to be one node, the number of the links which should be taken into consideration can be decreased, and shortening of arithmetic processing time can be attained. It is also expectable it to become easy to generate the node which has a new function, and to promote part-ization of a program with the combination of a node.

[0048]Next, it explains flowing [which realizes the network type information processor concerning the embodiment of the invention 1] into processing of a program. The flow chart of processing of a program in which the network type information processor concerning the embodiment of the invention 1 is realized is shown in drawing 12.

[0049]First, at the input Management Department, if a new input is detected (Step S121), according to the input concerned, mark addition and a cutout will give a mark about the node inputted and the node in a dependency (Step S122).

[0050]Next, scheduling of the node which the scheduling section searched for the node whose input is only an output from the node to which a mark is not given, and was searched for it out of the node to which the mark was given is carried out (Step S123). It is because it is necessary to process this node first. Scheduling of the node inputted immediately after the input will be carried out.

[0051]And it judges about whether there are an input performed to the last time to the node concerned and change about the contents of the input to the node by which scheduling was carried out (Step S124). Since it becomes the output value same also about this output as last time when there are not the last entry content and change (Step S124: No), it does not re-calculate by using the last result of an operation as an output value (Step S125). carrying out like this -- a part -- it is because calculation time [be / it] can be omitted and shortening of calculation time can be attained. On the other hand, when there are the last entry content and change, it will re-calculate based on (Step S124:Yes) and the contents of this input, and a new output value will be computed (Step S126).

[0052]About the node to which input and output were performed, the mark given by mark addition and the cutout is canceled (Step S127). It is for showing that data processing attached to the node concerned was completed. And the above-mentioned processing is repeated until a mark is canceled about all the nodes within network structure information (Step S128: No), When a mark is canceled about all the nodes, the result of an operation will be outputted in (Step S128:Yes) and an output control department (Step S129).

[0053]The recording medium which memorized the program which realizes the network type information processor concerning an embodiment of the invention, As shown in the example of the recording medium shown in drawing 13, not only in the portability type recording medium 132 of CD-ROM 132-1 or floppy disk 132-2 grade, Any of the recording media 134, such as other memory storage 132, a hard disk of the computer 133, and RAM, with which the point of the communication line was equipped may be sufficient, at the time of program execution, loading of the program is carried out and it is executed on main memory.

[0054]As the recording medium which recorded the last arithmetic processing result in each node generated by the network type information processor concerning an embodiment of the invention, etc. is also shown in the example of the recording medium shown in drawing 9, Not only in the portability type recording medium 132 of CD-ROM 132-1 or floppy disk 132-2 grade, When using the network type information processor which any of the recording media 134, such as other memory storage 131, a hard disk of the computer 133, and RAM, with which the point of the communication line was equipped may be sufficient as, for example, is applied to this invention, it is read by computer 133.

[0055]

[Effect of the Invention]According to the network type information processor applied to this invention as mentioned above, it can carry out without passing through the independent process of a node attaching renewal of network structure information, and sorting it, and it becomes possible to change the dependency between nodes freely. Even if it is a case where change arises in network structure by an addition, deletion, etc. of a node, it becomes possible to perform continuously, without interrupting processing. It can carry out.

[0056]If it can be controlled by addition and deletion of a mark whether it is a node which is the necessity for a re-calculation according to the network type information processor concerning this invention and only the node which is the necessity for a re-calculation is re-calculated, it will be a suitable order, and it becomes possible to perform processing by the minimum calculation time moreover.

[0057]According to the network type information processor concerning this invention, by recognizing two or more nodes to be one node, the number of the links which should be taken into consideration can be decreased, and shortening of arithmetic processing time can be attained. It is also expectable it to become easy to generate the node which has a new function, and to promote part-ization of a program with the combination of a node.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]The lineblock diagram of the network type information processor concerning the embodiment of the invention 1
[Drawing 2]The explanatory view of the network structure information in the network type information processor concerning the embodiment of the invention 1
[Drawing 3]The illustration figure of the mark processing in the network type information processor concerning the embodiment of the invention 1
[Drawing 4]The illustration figure of the mark processing in the network type information processor concerning the embodiment of the invention 1
[Drawing 5]The illustration figure of the mark processing in the network type information processor concerning the embodiment of the invention 1
[Drawing 6]The illustration figure of the node in the network type information processor concerning the embodiment of the invention 1
[Drawing 7]The lineblock diagram of the network type information processor concerning one example of this invention
[Drawing 8]The lineblock diagram of the network type information processor concerning other examples of this invention
[Drawing 9]The lineblock diagram of the network type information processor concerning other examples of this invention
[Drawing 10]The illustration figure of the network structure information in the network type information processor concerning the embodiment of the invention 2
[Drawing 11]The illustration figure of the network structure information in the network type information processor concerning the embodiment of the invention 2
[Drawing 12]The flow chart of the processing in the network type information processor concerning the embodiment of the invention 1
[Drawing 13]The illustration figure of a recording medium
[Description of Notations]
1, 28 processing engine
2, 29 network structure information
3 Input Management Department
4 Mark addition and a cutout
5 Structure Management Department
6 Scheduling section
7 Output control department
8, 9, 10, 11, 12, 13, 14, 35, 36, 37, 38, 39, 40, 41, 42, 43, and 44 Node
15 and 16 Input
17, 18, 19, 20, 21, 22, and 23 Link
24 and 25 Output

26 Group
27 Image display device
30 Input controlling device
31 Mark addition / deletion device
32 Structure controlling device
33 Scheduler
34 Output control device
131 Memory storage of the circuit point
132 Portability type recording media, such as CD-ROM and a floppy disk
132-1 CD-ROM
132-2 Floppy disk
133 Computer
134 Recording media, such as RAM/hard disk on a computer

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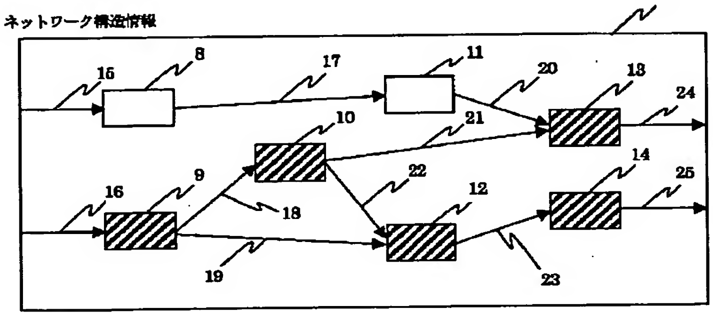
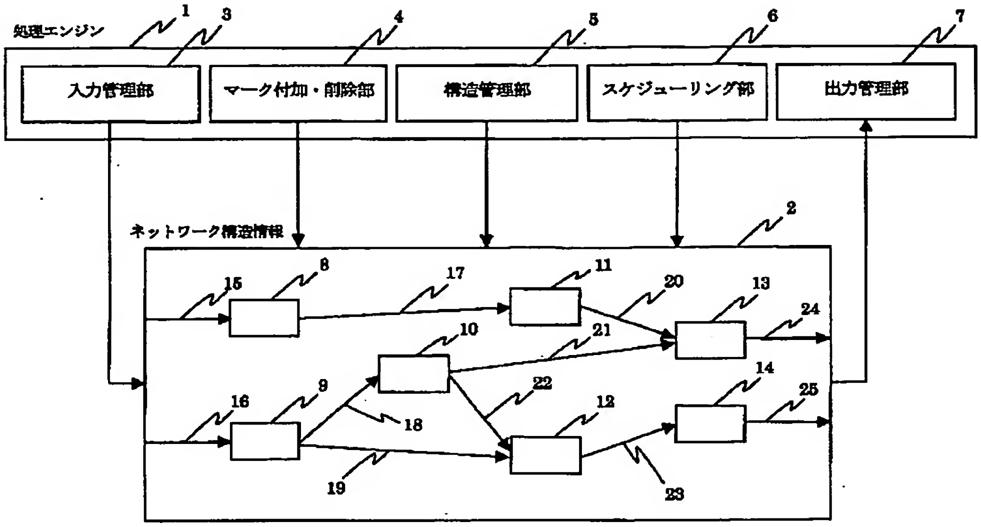
DRAWINGS

[Drawing 2]



[Drawing 1]


処理エンジン
1
3
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5
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7
入力管理部
マーク付加・削除部
構造管理部
スケジューリング部
出力管理部
ネットワーク構造情報
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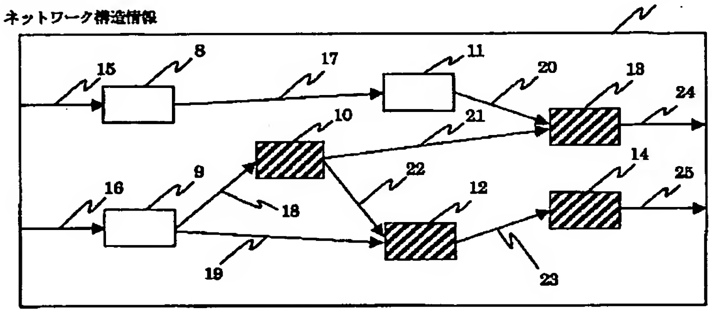
[Drawing 3]


ネットワーク構造情報
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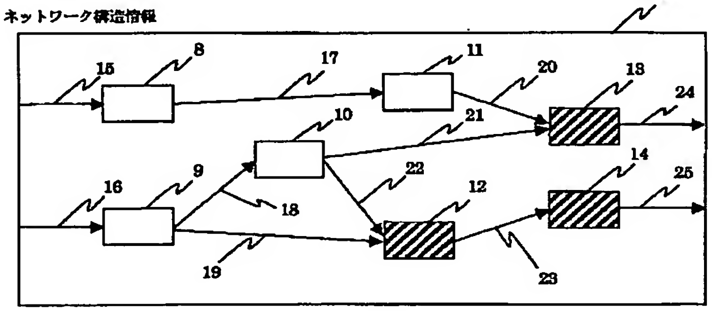
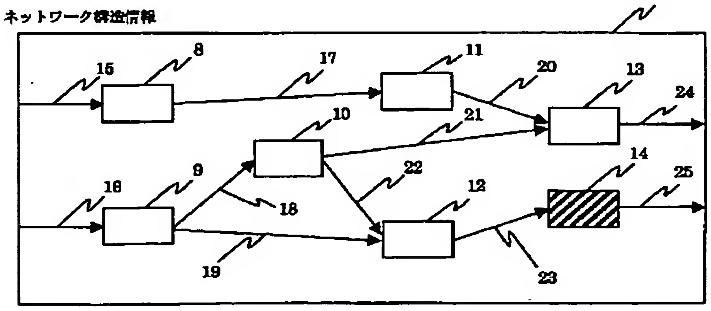
23

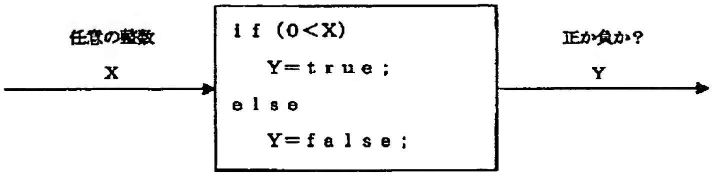
[Drawing 4]


ネットワーク構造情報
2
15
8
17
11
20
13
24
10
21
22
14
25
16
9
18
12
19
23

[Drawing 5]

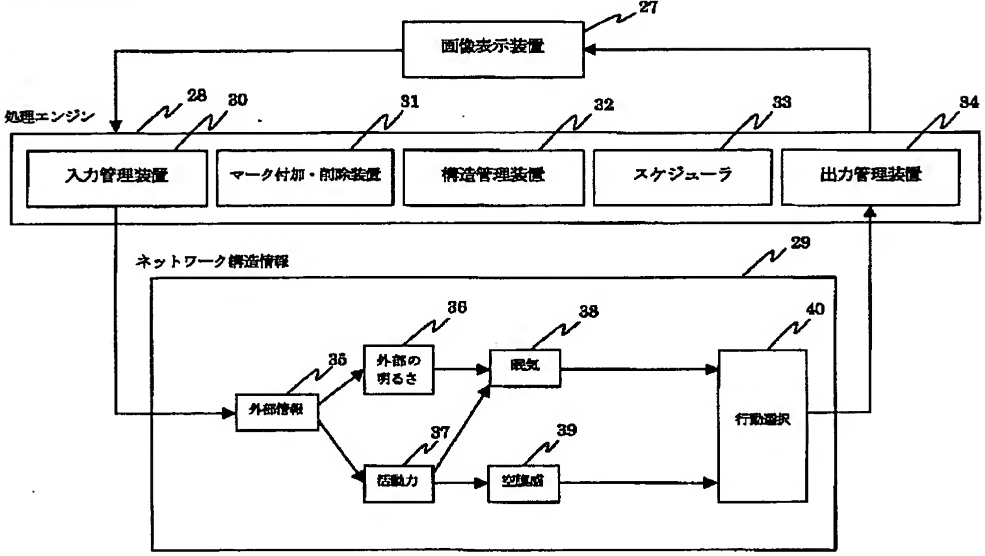

ネットワーク構造情報
2
15
8
17
11
20
13
24
10
21
22
14
25
16
9
18
12
19
23

[Drawing 6]

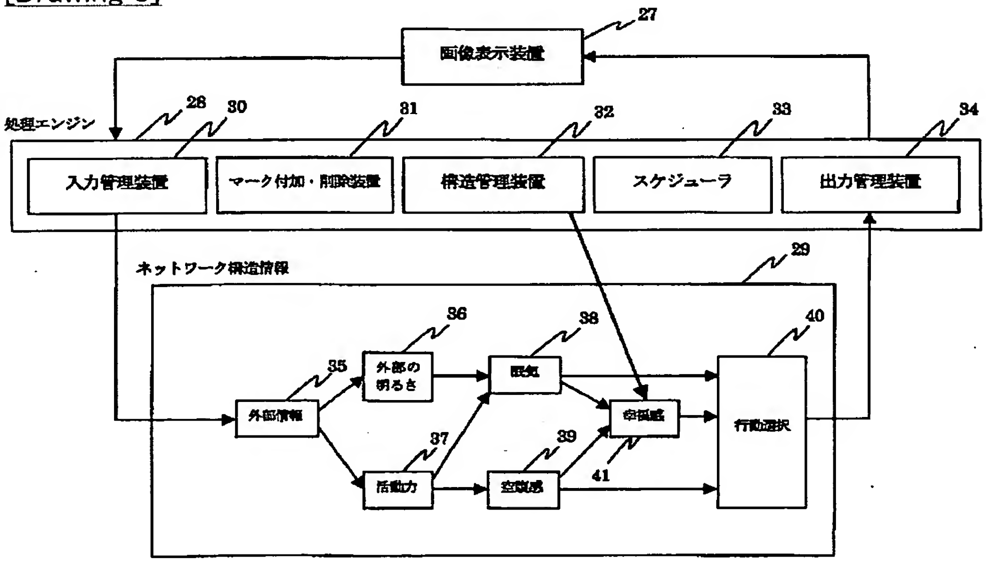

任意の整数
X
正か負か？
Y

```
if (0<X)
   Y=true;
else
   Y=false;
```

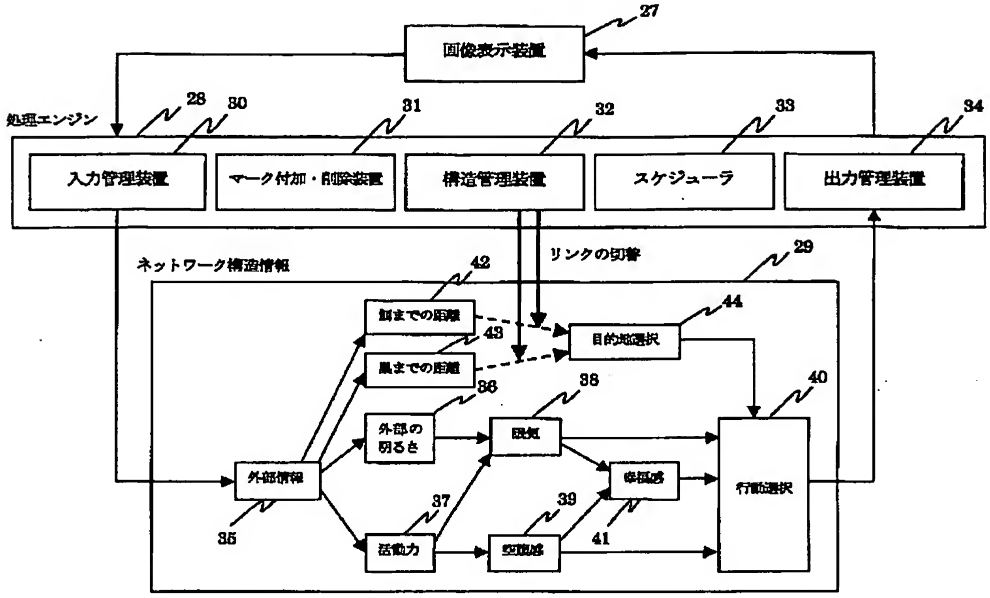
[Drawing 7]


27
画像表示装置
処理エンジン
28
30
31
32
33
34
入力管理装置
マーク付加・削除装置
構造管理装置
スケジューラ
出力管理装置
ネットワーク構造情報
29
36
38
40
35
外部の明るさ
眠気
外部情報
37
39
行動選択
活動力
空腹感

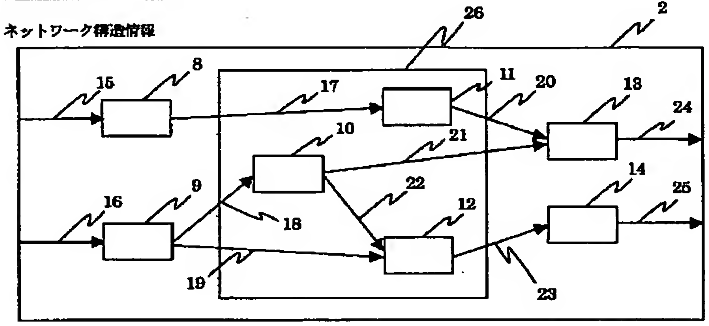
[Drawing 8]


27
画像表示装置
処理エンジン
28
30
31
32
33
34
入力管理装置
マーク付加・削除装置
構造管理装置
スケジューラ
出力管理装置
ネットワーク構造情報
29
36
38
40
35
外部の明るさ
眠気
外部情報
幸福感
行動選択
37
39
活動力
空腹感
41

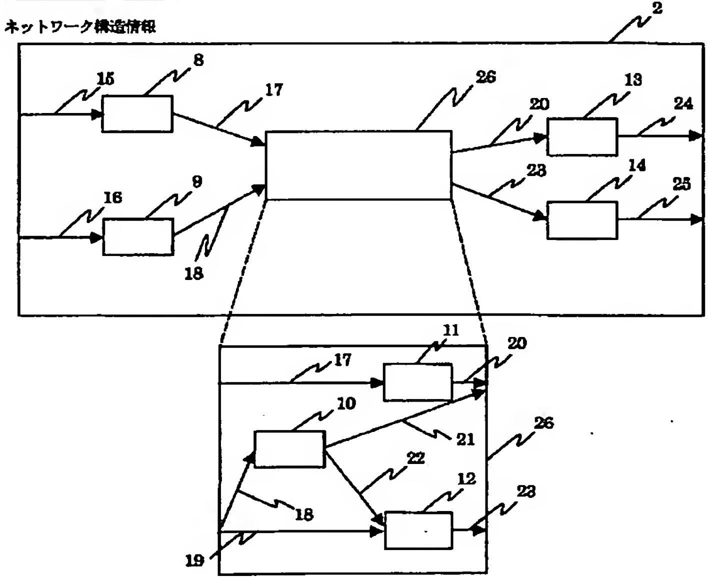
[Drawing 9]


27
画像表示装置
処理エンジン
28
30
31
32
33
34
入力管理装置
マーク付加・削除装置
構造管理装置
スケジューラ
出力管理装置
リンクの切替
ネットワーク構造情報
29
42
餌までの距離
43
巣までの距離
44
目的地選択
36
外部の明るさ
38
眠気
40
外部情報
幸福感
行動選択
35
37
活動力
39
空腹感
41

[Drawing 10]

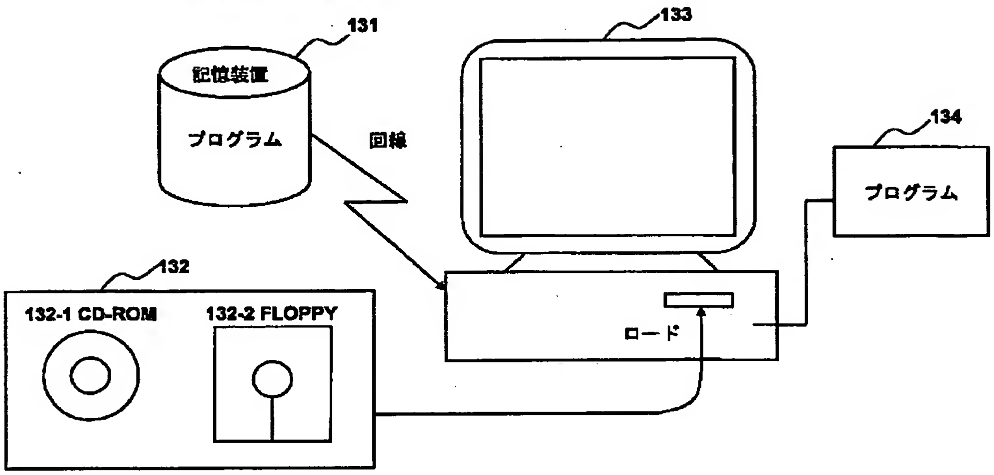

ネットワーク構造情報
26
2
8
15
17
11
20
13
24
10
21
9
16
22
12
14
25
18
19
23

[Drawing 11]

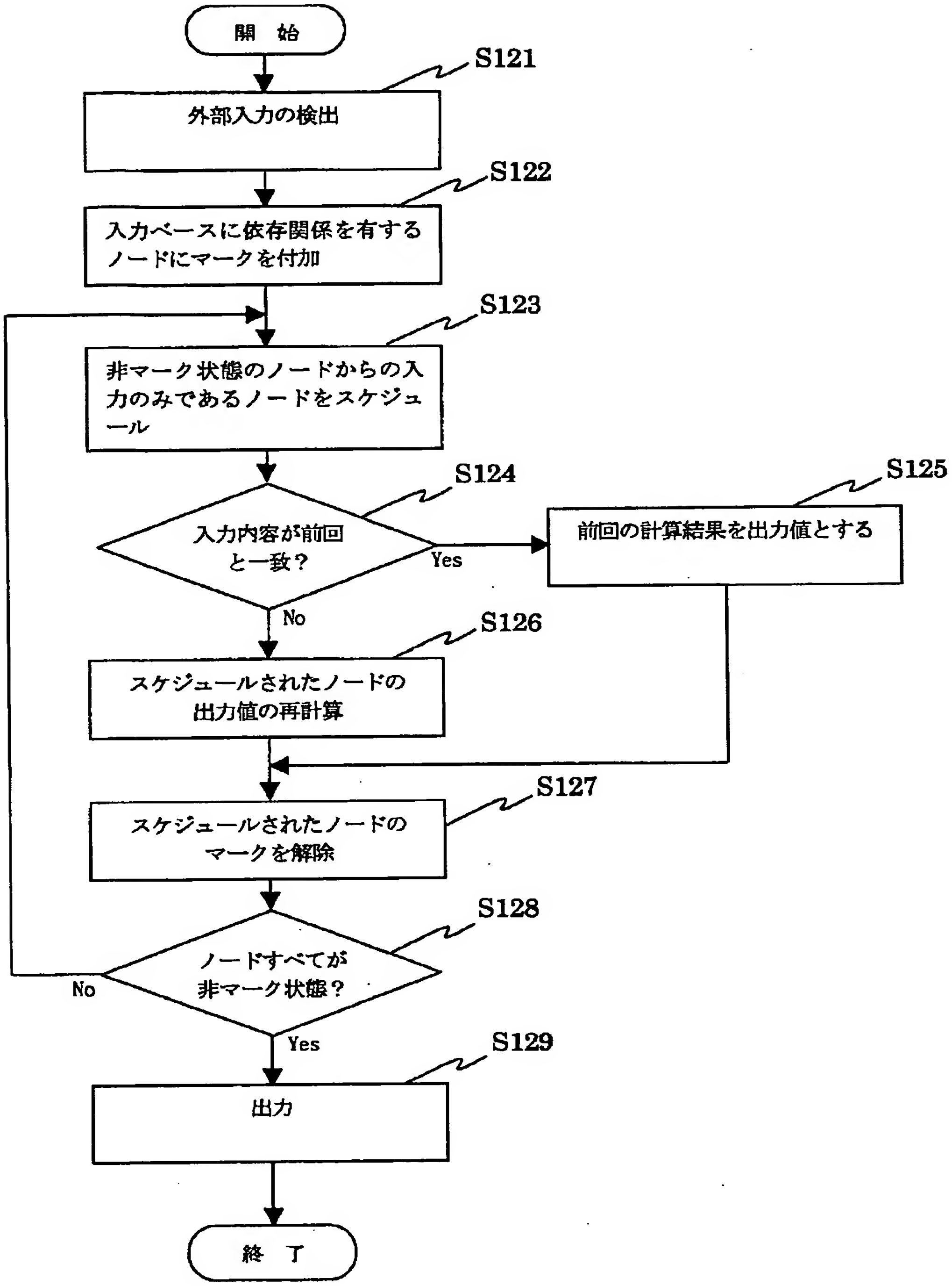

ネットワーク構造情報
2
8
15
17
26
20
13
24
16
9
23
14
25
18
11
20
17
10
21
26
22
12
23
18
19

[Drawing 13]

記録媒体の例を示す図


131
記憶装置
プログラム
回線
133
134
プログラム
132
132-1 CD-ROM
132-2 FLOPPY
ロード

[Drawing 12]


開　始
S121
外部入力の検出
S122
入力ベースに依存関係を有するノードにマークを付加
S123
非マーク状態のノードからの入力のみであるノードをスケジュール
S124
入力内容が前回と一致？
Yes
S125
前回の計算結果を出力値とする
No
S126
スケジュールされたノードの出力値の再計算
S127
スケジュールされたノードのマークを解除
S128
ノードすべてが非マーク状態？
No
Yes
S129
出力
終　了

[Translation done.]